Options for intensifying cereal-legume cropping systems in West Africa

Asamoah Larbi[1], Abdul Rahman Nurudeen[1], Saaka Buah[2], Roger Kanton[2] and Bekele Kotu[1]
[1]International Institute of Tropical Agriculture, Tamale-Ghana;
[2]Savana Agriculture Research Institute, Tamale-Ghana

Key messages

- ✓ Most small-scale farmers in the West Africa savanna zone grow cereals and legumes for home consumption and cash.
- ✓ Crop yields are low due to several factors including poor agronomic practices, limited use of inputs, declining soil fertility, pest and diseases and limited access to information.
- ✓ Identification, dissemination and adoption by farmers of good agronomic practices (GAPs) can diversify and sustainably intensify the cropping system.

Objectives

To identify and disseminate GAPs to intensify cereal and legume production in northern Ghana with farmers. GAPs tested included:

- ✓ Cereals-legume rotations and strip-cropping (Fig. 1).
- ✓ Integrated soil fertility management practices involving maize, soybean and cowpea, and
- ✓ Integrated crop-livestock systems.

Approach

- ✓ The Community-based Technology Park (TP) approach which is a researcher and farmer managed trials and also serves as demonstrational fields for farmers to learn good agronomic practices was used to evaluate different sustainable intensification (SI) cropping systems.
- ✓ The trials involved a minimum of three SI systems randomly replicated in four intervention communities of the Africa RISING project over a period of 2-4 years. Farmers' preferences for systems within a trial were determine during farmers' field days.

Key results

- ✓ Maize stripped-cropped with cowpea or groundnut in ratios of 2:2 or 2:4 have potential to improve productivity of the cereal-legume cropping systems (Table 1).
- ✓ Application of either Rhizobium inoculant or triple supper phosphate alone, or in combination can improve soybean grain yields (Fig. 2). Keeping sheep and goats on fallow land before cropping and application of NPK fertilizer can improve maize grain yields (Fig. 3).

Significance and scaling potential

- ✓ Increased grain yields from the GAPs would increase grain yield for household consumption and sale of excess to generate income. Integration of legumes, livestock and NPK into the cropping systems will restore and improve soil fertility.
- ✓ The GAPS have potential of reaching 40,000 households.

Partners

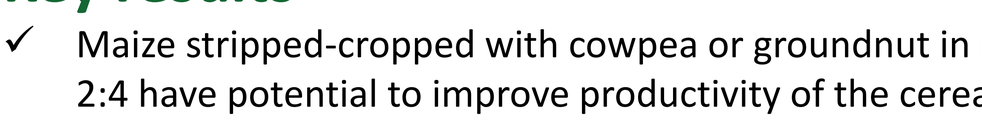

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Figure 1: Maize strip-cropped with soybean and cowpea in northern Ghana.

Table 1. Maize-legume strip cropping effects on grain yield, land equivalent ration (LER) and land save (LS).

	Grain yield kg/ ha				
Strip cropping	M	C	G	LER	LS (%)
Maize (M)	3199.6	-	-	-	-
Cowpea (C)	-	647.1	-	-	-
Groundnut (G)	-	-	665.7	-	-
2M : 2C	3033.7	711.5	-	2.2	51.1
2M : 2G	3016.1	-	358.4	1.8	39.1
2M : 4C	2619.1	674.3	-	6.8	36.9
2M: 4G	2984.9	-	391.6	2.1	48.1
s.e	255.55	58.23	117.51	2.46	5.00
P-value	ns	ns	ns	-	-

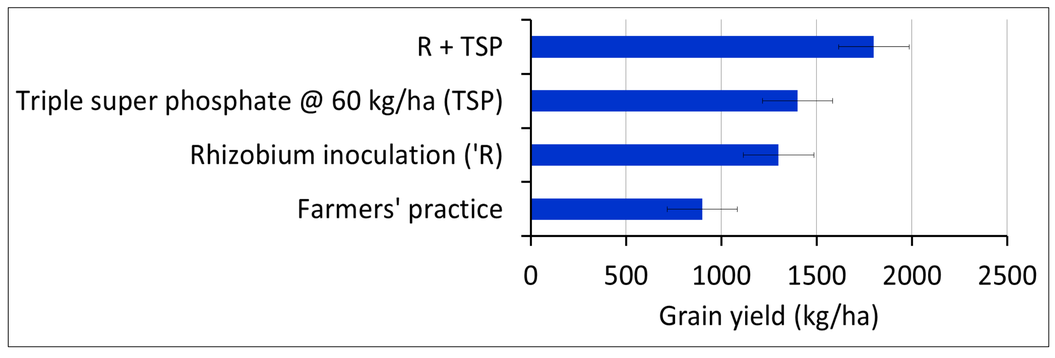

Figure 2: Integrated soil fertility effect on soybean grain yield.

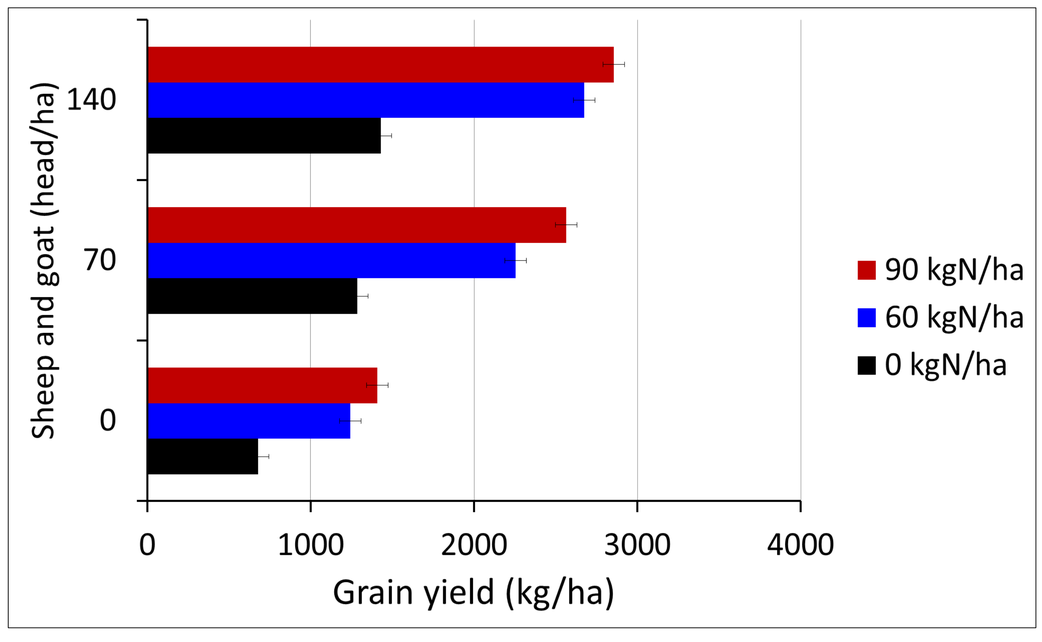

Figure 3: Sheep and goat density and nitrogen fertilizer effects on maize grain yield.